PB100

Ultrasonic WeatherStation™ Instrument

Sensing a change in the weather.

Seven Essential Weather Readings With No Moving Parts!

The Airmar Ultrasonic WeatherStation™ Instrument detects instantaneous changes in the weather. Our WeatherCaster™ Software allows you to have your own personal weatherman on-board the boat, 24 hours a day, 7 days a week!

Before Leaving the Dock—Make the decision whether or not to spend your day on the water. Anticipate weather fronts by checking the wind speed and direction, temperature, and barometric pressure. Check the weather history graphs as the WeatherCaster™ Software can store readings for up to 72 hours.

Underway—Monitor up-to-the-minute weather conditions at your location. See where and when the fish will bite best, based on wind conditions and a rising or falling barometer.

Docking—The on-board PC or chartplotter can display true wind data to make docking a vessel in high wind a breeze.

WeatherCaster™ Software—Easy-to-use multiple screen views and backgrounds to fit your needs. The wind-tunnel tested, compact sensor with removable cable makes for a simple installation. The built-in WAAS GPS can serve as a primary position source or backup to your electronics suite.

- **True wind speed and direction**
- **Apparent wind speed and direction**
- **Internal WAAS GPS**
- **Two-axis solid-state compass—no moving parts**
- **Pitch and roll**
- **Barometric pressure**
- **Relative humidity**
- **Air temperature**
- **Wind chill temperature**
- **Dew point temperature**
- **Heat index temperature**
- **NMEA 0183 output**

WeatherCaster™ Software digital screen

Every Airmar WeatherStation™ Instrument is calibrated in our on-site wind tunnel, whose wind measurements are traceable to a National Institute of Standards and Technology (NIST) Standard Reference Material.

AIRMAR® TECHNOLOGY CORPORATION

REGISTERED TO ISO 9001:2000

PB100
Technical Information

Ultrasonic WeatherStation™ Instrument

Specifications*

Wind Speed Range	0 to 80 knots (0 to 92 MPH)
Wind Speed Resolution	0.1 knot (0.1 MPH)
Wind Speed Accuracy @ 0°C to -40°C (0°F to -40°F), no precipitation	2 knots RMS (2.3 MPH) or ±4%, whichever is greater
Wind Speed Accuracy in wet conditions	5 knots RMS (5.7 MPH)
Wind Direction Range	0° to 360°
Wind Direction Resolution	0.1°
Wind Direction Accuracy @ 0°C to -40°C (0°F to -40°F), no precipitation	2° RMS
Wind Direction Accuracy in wet conditions	5° RMS
Operating Temperature Range	-25°C to 55°C (-13°F to 131°F)
Temperature Accuracy	±1.5°C (±2.7°F) @ >4 knots (4.6 MPH) wind
Temperature Resolution	0.1°C (0.1°F)
Compass Accuracy	3° RMS static heading (no magnetic interference and level)
Barometric Pressure Range	850 to 1050 mbar (25 to 34 inHg, 850 to 1150 hPa)
Barometric Pressure Accuracy	±20 hPa (±0.59 inHg, ±20 mbar) when altitude correction is available
Relative Humidity Range	10% to 95% RH
Relative Humidity Accuracy	±4% Units RH
Supply Voltage	10 VDC to 16 VDC
Weight	285 grams (0.7 lb)
Power Consumption	<100 mA in normal operation (up to 650 mA with heater)
Sensor Baud Rate	4800 bps can be increased to 38,400 bps with a command
Thread Size	1"-14 standard marine mount

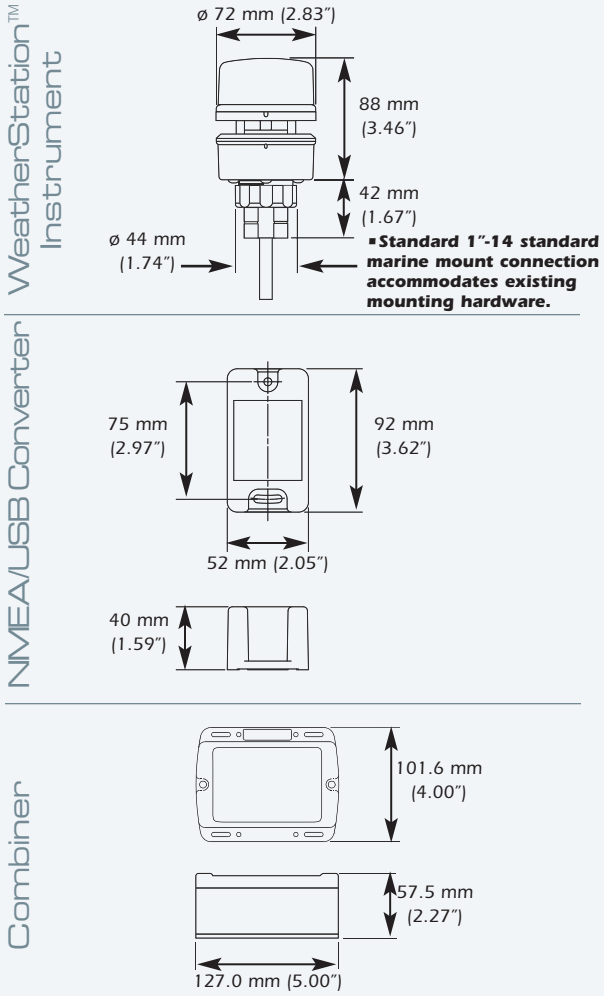
* *Below 0°C (32°F), the wind speed and direction may be less accurate.*
** *When wind speed is less than 4 knots (4.6 MPH) and/or heater is on, temperature and humidity readings will be less accurate.*
*** *Wet conditions include moisture, rain, snow and/or sea spray on the blue plate.*

Options

- Converter interface provides plug and play compatibility with a PC

- Optional Combiner interface allows the WeatherStation™ Instrument data to be displayed simultaneously on both a PC and an NMEA device
- Connect an Airmar Smart™ Sensor to also get water depth, speed, and temperature data

Dimensions



Data Output Protocol

NMEA 0183 Sentence Structure

$WIMWV	Wind Speed and Angle	$GPGGA	GPS Fix Data
$WIMWD	Wind Direction and Speed	$GPGLL	Geographic Position L/L
$WIMDA	Meteorological Composite	$GPGSA	GNSS DOP/Active Satellites
$WIVWR	Relative Wind Direction/Speed	$GPGSV	Satellites in View
$WIVWT	True Wind Direction/Speed	$GPRMC	Recommended Minimum GNSS
$WIXDR	Transducer Measurements	$GPZDA	Time and Date
$YXXDR(A)	Temperature/Pressure Transducer Measurement	$GPVTG	COG and SOG
$YXXDR(B)	Attitude Transducer Measurements	$HCHDG	Heading, Deviation, Variation

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As Airmar constantly improves its products, all specifications are subject to change without notice. All Airmar products are designed to provide high levels of accuracy and reliability; however, they should only be used as aids to navigation and not as a replacement for traditional navigation aids and techniques.

AIRMAR® TECHNOLOGY CORPORATION
Tel: 603.673.9570 ▪ Fax: 603.673.4624 ▪ www.airmar.com

LB100

Ultrasonic WeatherStation™ Instrument

Preliminary

Actual size

7 essential weather sensors in one compact unit.

Real-Time, Site Specific Weather Information

Airmar's Ultrasonic WeatherStation™ Instrument meets a growing need for businesses requiring real-time, site specific weather information. Accurate data helps organizations make important decisions regarding weather conditions that affect safety and operations. Traditional weather instrumentation is composed of several individual sensors including wind cups, which are prone to breaking and are less accurate at low speeds. Airmar's WeatherStation™ Instrument incorporates seven sensors, with no moving parts, all in one compact unit.

- **True wind speed and direction**
- **Apparent wind speed and direction**
- **Barometric pressure**
- **Relative humidity**
- **Air temperature**
- **Wind chill temperature**
- **Dew point temperature**
- **Internal WAAS GPS**
- **NMEA 0183 output**
- **Low maintenance**
- **No moving parts**
- **Two-year warranty**

best of sensors expo 2006

AIRMAR® TECHNOLOGY CORPORATION

REGISTERED TO ISO 9001:2000

LB100
WeatherStation™ Instrument

Ultrasonic WeatherStation™ Instrument

Airmar Ultrasonic WeatherStation™ Instrument

The Airmar WeatherStation™ Instrument is the only all-in-one weather sensor that calculates apparent wind speed and direction, barometric pressure, air temperature, relative humidity, dew point and wind chill temperature. With the optional internal compass and Global Positioning System, true wind speed and direction can also be calculated. The UV stabilized, compact housing is fully waterproof and resistant to chemicals.

The WeatherStation™ Instrument comes with our intuitive WeatherCaster™ Software. Data can be viewed in both digital and analog format and can be saved for a set period of time. The log time can be adjusted in intervals from 6 to 72 hours. Standard NMEA sentences and an RS485 interface allows for the flexibility of designing your own software program to fit your specific application. Our comprehensive technical manual makes the job easy!

Software updates are available on Airmar's website: www.airmar.com

Airmar's WeatherStation™ Instrument utilizes a standard 1-14" UNS thread connection to accommodate standard mounting hardware. The waterproof base connector assures trouble-free installation and servicing, while a quick disconnect feature allows for easy removal. Standard cable lengths of 10 m or 15 m (33' or 49') allow you to simply connect the sensor to the optional USB Converter Box. The converter allows the WeatherStation™ Instrument measurements to be displayed on a PC by converting the data from RS485/NMEA 0183 to USB.

State-of-the-Art Wind Tunnel

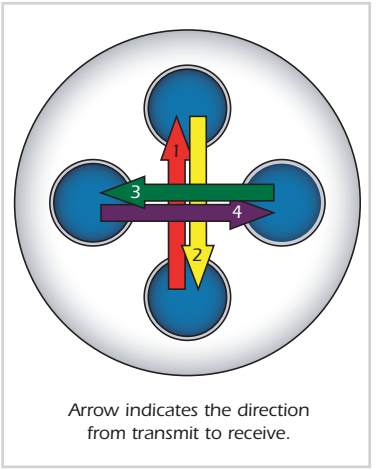
Every Airmar WeatherStation™ Instrument is calibrated in our on-site wind tunnel, whose wind measurements are traceable to a National Institute of Standards and Technology (NIST) Standard Reference Material.

How the WeatherStation™ Instrument Works

The ultrasonic wind sensor (an ultrasonic anemometer) measures apparent wind speed and direction. The WeatherStation™ Instrument contains four ultrasonic transducers, visible through the four holes in the top of the sensor's wind channel (see figure 1). These transducers operate in pairs—one transducer injects a pulse into the air, and the other (directly opposite to it) listens for the arrival of that pulse (see figure 2). Each pulse bounces off the anodized aluminum plate at the bottom of the wind channel and is carried by the wind to arrive at the opposing transducer a short time later. When there is no wind, the pulse travels at the speed of sound from the sender to the receiver. Whenever the wind is blowing in that direction, the pulse will arrive sooner than if the air is still. Similarly, whenever the wind is blowing in the opposite direction, the pulse will arrive later than if the air is still. The four transducers take turns in sending and receiving pulses to cover all eventualities of wind direction. A built-in microprocessor combines the measurements from all four transducers to calculate the resultant wind speed and direction. The sensor monitors the air temperature, to compensate for the fact that the speed of sound in air changes with temperature. (The aluminum plate heats up to prevent frost and moisture from altering the wind readings.) Flow disturbances caused by the five posts are compensated for in software. Each WeatherStation™ Instrument is calibrated in Airmar's wind tunnel to provide compensation for variations in production as well as asymmetry in the airflow channel.

The WeatherStation™ Instrument has the unique ability to display both true and apparent wind. True wind is the actual motion of the air relative to the earth. Apparent wind is the wind which an observer experiences while moving or on a moving vehicle. It is the result of these two motions—the actual motion of the air (the true wind) and the motion of the vehicle. If the vehicle is not moving, then the true and apparent wind will be the same.

Figure 1



Arrow indicates the direction from transmit to receive.

Figure 2

Data can be displayed in the following units of measure:

Wind Speed
- MPH—miles per hour
- Knots—1 knot = 1.15 miles MPH
- KPH—kilometers per hour

Barometric Pressure
- inHg—inches of mercury
- mbars—mill bars

Temperature
- °F—Fahrenheit
- °C—Celsius

LB100 Applications

Ultrasonic WeatherStation™ Instrument

The Airmar WeatherStation™ Instrument makes accurate and reliable weather data available to a wide-range of applications such as:

Agriculture

Chemical processing

Greenhouse

Hazardous response

Marine

Offshore platforms and docks

Outdoor leisure centers

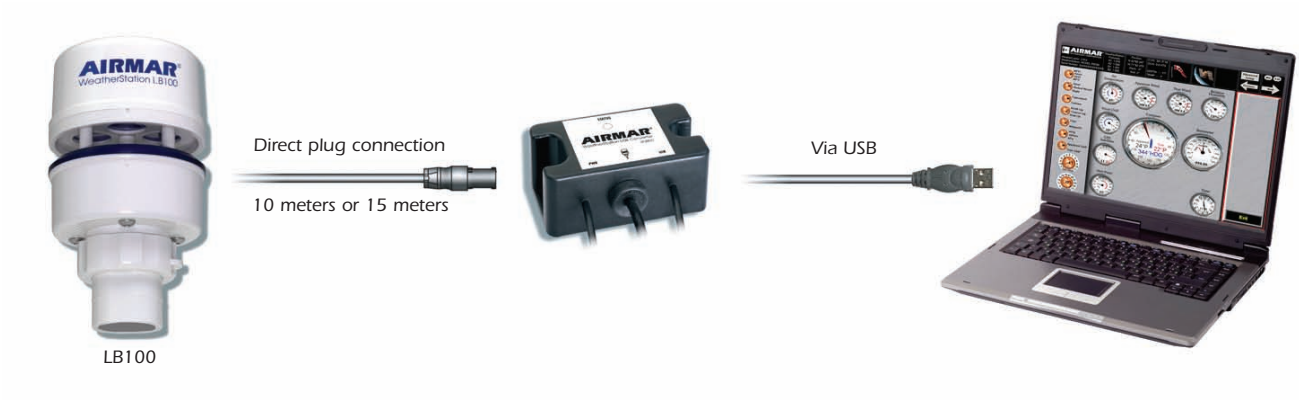
Recreation vehicles

Road weather monitoring

Structural monitoring

Connecting a WeatherStation™ Instrument to the PC

When connecting the WeatherStation™ Instrument to a PC only, a USB converter is required. The WeatherStation™ Instrument attaches to the USB box via a plug-in cable.



The USB converter allows the WeatherStation™ Instrument data to be effortlessly converted and sent to the PC.

LB100 Technical Information

Ultrasonic WeatherStation™ Instrument

Specifications*

Wind Speed Range	0 to 92 MPH (0 to 148 KPH)
Wind Speed Resolution	0.1 MPH (0.1 KPH)
Wind Speed Accuracy @ 0°C to -40°C (0°F to -40°F), no precipitation	2.3 MPH RMS (3.7 KPH) or ±4%, whichever is greater
Wind Speed Accuracy in wet conditions	5 MPH RMS (8 KPH)
Wind Direction Range	0° to 360°
Wind Direction Resolution	0.1°
Wind Direction Accuracy @ 0°C to -40°C (0°F to -40°F), no precipitation	2° RMS
Wind Direction Accuracy in wet conditions	5° RMS
Operating Temperature Range	-25°C to 55°C (-13°F to 131°F)
Temperature Accuracy	±1.5°C (±2.7°F) @ >5 MPH (8 KPH) wind
Temperature Resolution	0.1°C (0.1°F)
Compass Accuracy	3° RMS static heading (no magnetic interference and level)
Barometric Pressure Range	850 to 1050 mbar (25 to 34 inHg, 850 to 1150 hPa)
Barometric Pressure Accuracy	±20 hPa (±0.59 inHg, ±20 mbar) when altitude correction is available
Relative Humidity Range	10% to 95% RH
Relative Humidity Accuracy	±4% Units RH
Supply Voltage	10 VDC to 16 VDC
Weight	285 grams (0.7 lb)
Power Consumption	<100 mA in normal operation (up to 650 mA with heater)
Sensor Baud Rate	4800 bps can be increased to 38,400 bps with a command
Thread Size	1-14" UNF, 3/4" NPT

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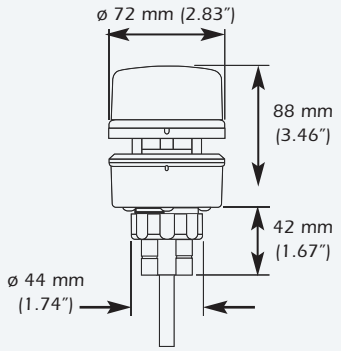
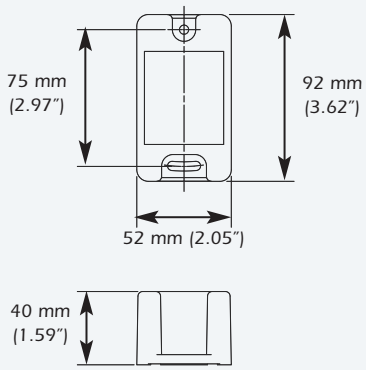
** *When wind speed is less than 4 knots (4.6 MPH) and/or heater is on, temperature and humidity readings will be less accurate.*
*** *Wet conditions include moisture, rain, snow and/or sea spray on the blue plate.*

Dimensions

WeatherStation™ Instrument



USB Converter



Sensor Provides

Apparent Wind Speed And Direction	Ultrasonic anemometer
Air Temperature	Based on a negative temperature coefficient thermistor that measures the ambient air temperature.
Relative Humidity	Measured with a capacitive cell humidity sensor.
Barometric Pressure	Measured using a temperature-compensated silicon piezoresistive pressure sensor.
Magnetic Compass Heading	Two-axis magneto-inductive sensors
Pitch And Roll Angles	Three-axis MEMS accelerometer
Position, Speed And Course Over Ground	Global Positioning System (GPS) receiver

Materials

White Housing	GE® Geloy®
Blue Plate	Anodized Aluminum
Wind Channel	Dupont™ Delrin®

Data Output Protocol

NMEA 0183 Sentence Structure

$WIMWV	Wind Speed and Angle
$WIMWD	Wind Direction and Speed
$WIMDA	Meteorological Composite
$WIXDR	Wind Chill Temperature
$GPGGA	GPS Fix Data
$GPGLL	Geographic Position L/L
$GPRMC	Recommended Minimum GNSS
$GPVTG	COG and SOG
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All Airmar products are designed to provide high levels of accuracy and reliability. As Airmar constantly improves its products, all specifications are subject to change without notice. LB100_rC 09/26/07

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